pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southeast Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0050148**
Facility Type	**Municipal**	APS ID	**1030256**
Major / Minor	**Minor**	Authorization ID	**1339298**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Warwick Township Water & Sewer Authority**	Facility Name	**Fish Creek STP**
Applicant Address	1733 Township Greene	Facility Address	1980 Deer Run Drive
	Jamison, PA 18929		Jamison, PA 18929
Applicant Contact	Michael Sullivan	Facility Contact	Daniel Ervin
Applicant Phone	(215) 343-3584	Facility Phone	(215) 343-3584
Client ID	64253	Site ID	256083
Ch 94 Load Status	Not Overloaded	Municipality	Warwick Township
Connection Status	No Limitations	County	Bucks
Date Application Received	January 8, 2021	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: Permit Renewal

Summary of Review

Permittee, Warwick Township Water & Sewer Authority submitted application for renewal of NPDES Permit to discharge 0.85 mgd of treated sewage into Fish Creek, a tributary of Neshaminy located in Warwick Township, Bucks County.

The sewer treatment plant (STP) is an activated sludge process utilizing (3) basin sequencing batch reactor (SBR) system with an Omni-flo programmable logic controller provided by Evoqua/Jet Tech. The facility includes a headworks building for screening, an influent SBR lift station, an influent equalization tank, three SBR basins, an aerobic digester, and ultraviolet disinfection unit. Effluent is discharged by gravity into Fish Creek. Digested sludge is removed by a licensed sludge hauler.

Sludge use and disposal description and location(s): Sludge is sent to Pottstown STP and DELCORA for treatment and disposal.

The permit limits for CBOD5, TSS, Ammonia, and NO2–NO3 for summer are respectively 15 mg/l, 30 mg/l, 1.5 mg/l, and 9.5 mg/l. The permit includes phosphorus limits that were developed based on existing mass loading, when the permit was renewed in 2011. Total phosphorus limits are 1.2 mg/l between April thru October, and 2.0 mg/l between November thru March. Effluent monitoring for E. Coli is included in this permit renewal and is in consistent with SOP.

Approve	Deny	Signatures	Date
X		Ketan Thaker Ketan Thaker / Project Manager	December 28, 2021
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	12/28/2021

Summary of Review

Water Quality-Based Limits:

Summery of Water Quality Protection Report (April 13, 2011)

CBOD5, Ammonia (NH3), and Dissolved Oxygen

Fish Creek STP discharges to UNT 02701 to Neshaminy Creek, approximately ½ mile upstream of the confluence with Neshaminy Creek. There are several sewage facilities located upstream on Neshaminy Creek, and several sewage facilities on Little Neshaminy Creek which intersects with Neshaminy Creek several miles downstream of Fish Creek STP. There is a public water supply intake located several miles downstream on Neshaminy Creek.

Based on a drainage area of 2.7 mi^2, the Q_{7-10} flow at Fish Creek STP is estimated at 0.15-cfs. The recommended site-specific design conditions for use in computer models such as PENTOXSD and/or WQM include:

Discharge pH = 7.0
Stream flow Q_{7-10} = 0.15-cfs (or equivalent low-flow yield = 0.057-cfsm)
Discharge flow Qd = 0.85-MGD
RMI (river mile index) = 0.5 miles and 0.01 miles
Stream Elevation = 213 feet and 172 feet
Drainage Area = 2.7 mi^2 and 2.8 mi^2 (USGS online drainage area tool)

The previous WQM model was reviewed for accuracy. It was determined that since Fish Creek STP discharges to a TSF, the in-stream dissolved oxygen (DO) goal was changed from 5.0 mg/l to 6.0 mg/l. Effectively, this changes the minimum DO limit from 5.0 mg/l to 6.0 mg/l. The other monthly average limits remain unchanged: CBOD5 = 15/25 mg/l, NH3 = 1.5/3.0 mg/l.

Nitrogen Limits (nitrite-nitrate as N, Total Kjeldahl Nitrogen (TKN))

Sewage facilities that discharge within the Neshaminy Creek basin have a combined effluent limit for ammonia and nitrite-nitrate equal to 11 mg/l during the critical low-flow period of July thru October. Since the ammonia limit for Fish Creek STP is 1.5 mg/l, the nitrite-nitrate limit is 9.5 mg/l. It is recommended to include a monitor/report limit for nitrite-nitrate for the period from November thru June.

Total nitrogen limits may be included in future permits. The sum of TKN and nitrite-nitrate is commonly used to calculate the total nitrogen. TKN is a test method that measures the sum of organic-nitrogen and ammonia. Therefore, it is recommended to include a monitor/report limit for TKN.

Phosphorous

The EPA is expected to develop a TMDL for Neshaminy Creek which may include numerical limits for total phosphorus. Therefore, the phosphorus load was capped until a TMDL was developed to address the impairment. The following procedure was used to develop the effluent limits for total phosphorus (TP):

The discharge monitoring reports between January, 2008 and August, 2010 indicated a long term average (LTA) concentration of TP of 0.56 mg/l and a monthly maximum concentration of 1.09 mg/l; and long term average (LTA) loading of TP of 3.6 lb/day and a monthly maximum loading of 7.1 lb/day. (Note: two months of DMR data missing)

The effluent limits for phosphorus were calculated based on the facilities average discharge load of phosphorus, converted to an average monthly limit (AML). Since the facility was operating near the permitted flow rate, it was determined that the facility can immediately achieve a total phosphorus limit of 1.0 mg/l, which corresponds to a load of 7.1 lbs/day at the permitted flow.

Using statistical methods outlined in EPA's *Technical Support Document for Water Quality-based Toxics Control* the effluent limits were calculated as follows:

AML = LTA * 1.97 (99^{th} %, CV = 0.64, n = 4) = 3.6 lbs/day * 1.97 = 7.1 lbs day
or

Summary of Review

AML = 7.1 lbs/day / (8.34 * 0.85 mgd) = 1.0 mg/l

Note: The EPA default CV = 0.6; was adjusted to CV= 0.64 due to site specific variability.

The proposed effluent limits were 1.0 mg/l (7.1 lbs/day) effective April 1st through October 30th, and 2.0 mg/l (14.2 lbs/day) effective November 1st through March 31st. The winter limits were calculated as twice the summer limit, up to a maximum of 2.0 mg/l. The winter limits were deferred for up to one year to allow for operational adjustments.

Phosphorus (Revision: February 23, 2011)

Based on a meeting with Warwick Township Water and Sewer Authority, the Authority provided a spreadsheet summarizing phosphorus discharge data and statistical analysis from 2007 thru 2010. After reviewing the data, the sample collected on August 30, 2007 was removed from the data set because it was an outlier which exceeded the permit limit of 4.0 mg/l. Based on the revised spreadsheet, the average loading was 3.63 lb/day, and the CV=0.72. The revised limits are:

AML = LTA * 2.12 (99th %, CV = 0.72, n = 4) = 3.63 lbs/day * 2.12 = 7.7 lbs day
AML = 7.7 lbs/day / (8.34 * 0.85 mgd) = 1.1 mg/l (Revision: April 13, 2011: AML = 1.2 mg/l)

Iron (Fe) / Aluminum (Al)

Ferric chloride and alum are commonly used chemicals for phosphate removal. Therefore, a monitoring condition for total iron, and total aluminum is recommended. The monitoring frequency for these two parameters is revised to quarterly from monthly in this permit renewal.

Ultraviolet Transmittance

As per SOP, UV Transmittance monitoring is included in permit in lieu of TRC (total residual chlorine) limits.

Act 14, Notification to Warwick Township on September 14, 2020
Act 14 Notification to Bucks County Commissioners on September 14, 2020

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.85
Latitude	40Âº 16' 4.28"	Longitude	-75Âº 5' 48.08"
Quad Name		Quad Code	
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to Neshaminy Creek (TSF, MF)	Stream Code	02701
NHD Com ID	25475758	RMI	0.5
Drainage Area	2.7	Yield (cfs/mi^2)	0.057
Q_{7-10} Flow (cfs)	0.015	Q_{7-10} Basis	2011 WQPR
Elevation (ft)	213	Slope (ft/ft)	
Watershed No.	2-F	Chapter 93 Class.	TSF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	FLOW REGIME MODIFICATION, SILTATION		
Source(s) of Impairment	CONSTRUCTION, MUNICIPAL POINT SOURCE DISCHARGES		
TMDL Status	Final (nutrient withdrawn)	Name	Neshaminy Creek

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters	Neshaminy Creek	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Treatment Facility Summary				
Treatment Facility Name: Fish Creek STP				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Sequencing Batch Reactor	Ultraviolet	0.85
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
1.275	2727	Not Overloaded	Aerobic Digestion	Other WWTP

Compliance History

DMR Data for Outfall 001 (from October 1, 2020 to September 30, 2021)

Parameter	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20
Flow (MGD) Average Monthly	0.622	0.543	0.511	0.607	0.597	0.595	0.817	0.806	0.644	0.802	0.653	0.577
Flow (MGD) Daily Maximum	1.852	0.92	0.662	0.975	1.042	0.835	1.706	1.768	1.1	1.776	1.381	1.078
pH (S.U.) Instantaneous Minimum	7.0	7.1	7.1	7.0	7.1	7.1	7.1	6.9	7.1	7.1	7.2	7.2
pH (S.U.) Instantaneous Maximum	7.6	8.1	7.6	7.6	7.4	7.4	7.4	7.4	7.5	7.5	7.5	7.7
DO (mg/L) Instantaneous Minimum	6.0	6.2	6.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.3	6.0
CBOD5 (lbs/day) Average Monthly	< 14	< 10	< 10	< 16	< 10	< 17	< 18	< 20	< 14	< 13	< 11	< 11
CBOD5 (lbs/day) Weekly Average	< 23	11	14	25	13	33	26	< 27	19	< 17	< 14	< 16
CBOD5 (mg/L) Average Monthly	< 2	< 2	< 2	< 3	< 2	< 4	< 2	< 3	< 3	< 2	< 2	< 2
CBOD5 (mg/L) Weekly Average	3	< 2	3	5	2	8	4	7	4	< 2	2	< 2
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	1451	1026	884	1101	1283	1302	2210	227.1	744	1154	957	848
BOD5 (mg/L) Raw Sewage Influent Average Monthly	237	317	200	237	277	261	292	1393	144	186	177	165.2
TSS (lbs/day) Average Monthly	< 15	< 7	< 13	< 12	< 5	< 8	< 7	< 7	< 5	< 11	< 8	< 13
TSS (lbs/day) Raw Sewage Influent Average Monthly	2114	1395	959	1162	1428	1498	1675	212	562	659	1084	705

TSS (lbs/day) Weekly Average	26	14	29	30	< 6	18	< 9	10	< 7	23	16	32
TSS (mg/L) Average Monthly	< 2	< 2	< 3	< 3	< 1	< 2	< 1	< 1	< 1	< 2	< 2	< 2
TSS (mg/L) Raw Sewage Influent Average Monthly	351	387	217	249	304	304	224	1231	107	109	199	137
TSS (mg/L) Weekly Average	4	3	6	7	1	4	1	1	1	4	3	4
Fecal Coliform (CFU/100 ml) Geometric Mean	< 3	< 2	< 3	< 2	< 2	< 2	< 2	< 55	< 2	< 2	< 2	< 2
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	10	< 2	10	< 2	< 2	< 2	< 2	4600	< 2	< 2	< 2	< 2
UV Transmittance (%) Instantaneous Minimum	96	96	96	96	96	96	96	96	96	96	96	96
Nitrate-Nitrite (lbs/day) Average Monthly	< 27.4	< 21.6	< 28.1	32.1	< 29	1073.8	< 34.0	< 25.5	17.5	< 38.1	31.2	< 40.7
Nitrate-Nitrite (mg/L) Average Monthly	< 4.6	< 4.6	< 6.0	< 7.1	< 6.2	7.3	< 4.5	< 3.8	3.4	< 5.9	5.9	< 7.0
Total Nitrogen (lbs/day) Average Monthly	< 36	< 23	58	< 35	< 36	36	< 50	< 15	< 25	< 45	24	< 41
Total Nitrogen (mg/L) Average Monthly	< 3.17	< 5.68	10.4	< 6.61	< 6.09	6.12	< 6.29	< 3.47	< 3.7	< 6.28	4.3	< 6.81
Ammonia (lbs/day) Average Monthly	1.5	< 0.9	< 1.0	< 2.3	< 0.5	< 0.5	< 1.2	< 0.5	< 0.5	< 0.6	< 0.5	< 0.7
Ammonia (mg/L) Average Monthly	0.3	< 0.2	< 0.2	< 0.5	< 0.1	< 0.1	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TKN (lbs/day) Average Monthly	6	3	8	5	4	5	11	7	< 3	5	6	4
TKN (mg/L) Average Monthly	0.53	0.67	1.42	0.98	0.6	0.87	1.37	1.57	< 0.5	0.64	1.07	0.67
Total Phosphorus (lbs/day) Average Monthly	0.2	0.8	0.7	0.6	0.6	0.9	1.7	1.9	< 0.5	0.8	0.9	2.3
Total Phosphorus (mg/L) Average Monthly	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.3	< 0.1	0.1	0.2	0.4

Total Aluminum (mg/L) Average Monthly	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Total Copper (mg/L) Average Monthly	0.002	0.004	0.006	0.004	0.004	0.003	0.002	0.004	0.003	0.003	0.003	0.003
Dissolved Iron (mg/L) Average Monthly	0.03	0.02	0.06	0.03	0.02	< 0.02	0.04	0.04	< 0.02	0.03	0.06	0.04
Total Iron (mg/L) Average Monthly	0.05	0.08	0.19	0.13	0.1	0.1	0.09	0.11	0.08	0.12	0.06	0.06
Total Hardness (mg/L) Average Monthly	122	126	170	162	153	155	90.7	192	168	152	156	170

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	6.0 Inst Min	XXX	XXX	XXX	1/day	Grab
CBOD5 Nov 1 - Apr 30	177	283	XXX	25	40	50	1/week	24-Hr Composite
CBOD5 May 1 - Oct 31	106	163	XXX	15	23	30	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS	212	319	XXX	30	45	60	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/week	Measured
Nitrate-Nitrite Nov 1 - Jun 30	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite

Outfall 001, Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Nitrate-Nitrite Jul 1 - Oct 31	67.4	XXX	XXX	9.5	XXX	19	1/week	24-Hr Composite
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Ammonia Nov 1 - Apr 30	21.2	XXX	XXX	3.0	XXX	6	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	10.6	XXX	XXX	1.5	XXX	3	1/week	24-Hr Composite
TKN	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Phosphorus Nov 1 - Mar 31	14.2	XXX	XXX	2.0	XXX	4	1/week	24-Hr Composite
Total Phosphorus Apr 1 - Oct 31	8.5	XXX	XXX	1.2	XXX	2.4	1/week	24-Hr Composite
Total Aluminum	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Total Iron	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite